Conserve and Win

GLOBAL war has produced an emergency condition in this country affecting every walk of life, not the least of which is in the field of automotive travel. Our acceptance of the automobile has been so full and complete that it seems impossible to regulate our lives in such way as to dispense with it even for non-essential use. Shortages of critical materials have made it mandatory that we effect such readjustment in order that our entire transportation resources become available for the war effort.

The importance of motor vehicle transportation and the need for conservation of cars, tires, and fuel has forced the creation of such Federal agencies as the Office of Defense Transportation, the Office of Price Administration and the National Traffic Advisory Committee to the War Department which is augmented by State Committees. All of these authorities are directly concerned with the regulation and conservation of our automotive resources.

The traffic engineer, regardless of the jurisdiction he may serve, is in a position to be particularly helpful in the development and execution of the programs directed by these agencies. Almost unlimited are the activities he can perform which will aid in these efforts if the availability of such assistance is made known to the administrative authorities, some of whom may not be familiar with the traffic field. Current factual data will aid administrators in shaping policies and making decisions.

Every engineer engaged in traffic control work of any nature, whether research, statistical, operations or mass transportation, should volunteer at once to participate with one or more of these official agencies in furthering its program. It should be feasible for most traffic engineers to initiate studies of traffic volume trends, speed adjustments as influenced by conservation measures, staggering of hours, pooling of vehicles, geometric design of war plant and cantonment access facilities, parking lot operation, accident trends, emergency application of traffic control devices, direction of military convoys, and evacuation routes.

Cooperation between the armed services is essential for victory in combat—so it is with the civilian effort in the service of supply. Here is our chance —let's not miss the bus.

Harry H. Harrison

Member, Board of Direction

VOLUME XII JUNE, 1942 NUMBER 14

YOUR CAR AT WAR

by PYKE JOHNSON

AT the very moment when efficient movement of men and materials is most needed, there are critical shortages of roads and rolling stock.

Passenger car production in the United States was terminated February 10. Assembly lines were uprooted to make way for all-out war production. In consequence, there is no automobile manufacturing industry in the United States today, and American motorists as a whole are now riding in their last cars for the duration of the war and possibly for months thereafter.

The enemy now controls areas from which come more than 95 per cent of our crude rubber supplies and those of the United Nations. The demands of the military forces of the United Nations have been stepped up to extraordinary figures. To bring into being the capacity of synthetic material now visualized by the government war program the administration must draw upon the stockpiles of materials critically needed for other war purposes such as sheared plate steel. That means that cargo ships, battleships and other instruments of war cannot be built as quickly.

There is no shortage of gasoline itself. The problem rests upon the loss of those tankers in the two oceans which have been a principal means of movement of gasoline in the past; in the sharply increased demand for fuel oil, which is an essential part of the war production problem, as well as a matter of warmth for millions of Americans; and, in the enormous new demands made upon our land facilities as a result of the shift in movement, and in the increase in the war program.

For forty years now, America has been building an economy geared to individual, personal transportation. Today we have 29,000,000 passenger motor cars in the United States. These vehicles for necessity use alone, have carried in the past three and one-half times as many billion miles of passenger traffic as all other forms of transportation put together.

We have only 141,000 buses. Of these 93,000 have been used in transporting children to and from schools. Today there are more than 45,000 communities in the United States which have no railroad transportation; there are six states which have no streetcars within their borders; there are 18,000,000 people living in rural areas but working in the city most of whom must travel all or a large part of the way by automobile to get to work.

Six months from now we face the dire possibility that there will be serious absenteeism in vital war plants due to tire failures. We cannot build new units of transportation to meet these essential requirements without dipping into critically needed stockpiles of war materials. We cannot build new housing units without encountering the same problem. We must make the most efficient use possible of existing facilities if we are to carry forward to victory. We must share our cars with our neighbors where motor vehicle use is necessary.

The American Association of State Highway Officials has endorsed a war transportaton conservation program. The Office of Defense Transportation has approved it. The Highway Traffic Advisory Committee to the War Department, headed by Thomas H. MacDonald, has developed in cooperation with ODT, a program which is being placed before state and local officials.

The Board of Trustees of the Automotive Safety Foundation, made up of the top-flight executives of the motor

vehicle, parts, oil, cement, rubber and the finance groups in the automotive industry, voted to expand and reorganize the Automotive Safety Foundation. They have dedicated this organization to full cooperation with responsible government officials and national groups.

The ASF program is as follows:

Conservation of man-power through traffic accident prevention.

Conservation of the vehicles and the materials going into their maintenace, or use.

Development of a sound highway program designed to bring highways up to standards essential to war use and to give men useful employment on the highways, once the war is over.

Specific elements of this program are:

Reduction in driving speeds.

Rigid voluntary limitations upon motor vehicle use.

Use of the vehicle only for essential driving.

Community efforts to stagger hours of industry, business and schools.

Intensive traffic accident prevention programs.

Pooling of car use to the fullest extent possible.

Release of scrap rubber for war purposes.

Dedication of highway funds to roads vitally needed for war transportation.

The American people have objectives in fighting this war, and one of them is that when it is over, the men who have fought it shall not starve, nor shall they be brought back to subsist on doles.

One of the largest fields for employment will be found in a great national highway development designed to provide the way for safe and efficient highway transportation. If we are to be ready when the war is over, we must have master plans ready for highway improvement, carried forward to the blueprint stage, and growing out of factual studies of transportation habits such as are contained in the state highway planning surveys. We must have changed those laws which stand in the way of quick acquisition of rights of way where needed in the public interest. We must be sure that competent highway engineering organizations are available. We must be sure that every penny of the revenues which will accrue from highway use are allocated equitably for maximum return.

Excerpts from a paper given by Pyke Johnson, President of the Automotive Safety Foundation before Indiana Safety Council, April, 1942.

EMPLOYEE TRANSPORT PLAN FOR WAR INDUSTRIES

by DWIGHT M. McCRACKEN *and* BRYANT BURKHARD

THE capacity of war industry in the U. S. will be limited by transportation inefficiencies rather than by its ability to produce.

One of the serious emergencies in the transportation picture involves the travel of war workers to and from plants. Many communities, now on war work, rely wholly upon private passenger cars to get workers to and from work since no other means of transportation is available.

If the unlimited use of automobiles by war workers continues, serious production delays will probably result from absenteeism of employees whose cars have been "grounded" through lack of tires, gasoline, or both. To aid insured war plants in forestalling this possibility, Liberty Mutual's Traffic and Safety Bureau surveyed employee transportation practices in policyholder plants on both coasts and in the middle west and found three basic

weaknesses in automobile transportation of employees.

1. *Waste of irreplaceable motor vehicles, their tires and gasoline.* The average number of workers per car ranged from 1.3 to 1.7 while the average capacity per car ranges from 4.5 to 5.0 causing a wastage of over one-half the total transportation capacity. Further wastage resulted from stop-and-go traffic on access routes.

2. *Waste of time and manpower through needless congestion and accidents.* The average speed over the last three miles to one plant was five miles per hour causing irritation and needless fatigue. Another plant lost three key men in as many weeks in fatal traffic accidents while driving to and from work. Still another averaged one lost-time injury per month from automobile accidents in the parking lots and adjacent roadways. Congestion at war plants affects the entire traffic circulation of the city. It delays delivery of important truck shipments. In one airplane engine assembly plant, 400 parts are brought by truck on a *time schedule* from 400 separate subcontractors. Lack of adequate offstreet parking space hinders all movement in streets around plants.

3. *Vulnerability to sabotage and air attack.* A catastrophe during shift changes would block emergency vehicles from reaching the plant because employee vehicles travel two and three lanes deep on some access roads. Sabotage or enemy air raids will most likely be planned for shift change times and accidents frequently occur at such times. Large concentrations of automobiles in parking areas adjacent to war industries aid enemy airman in finding vital targets. At night, the tops of solidly parked cars reflect as much skylight as does a body of water. In many plants vehicles occupy more ground area than the buildings. A concentration of parked cars itself invites bombing and the destruction of irreplaceable vehicles. Long lines of cars at shift changes direct enemy airmen to the plant in daylight or darkness. Lines of employee drivers afford a profitable strafing target for enemy airmen, who know that skilled workers cannot be easily or quickly replaced.

At each plant studied it seemed to Liberty Mutual's traffic engineers that all of these various problems could be solved completely or partially through the achievement of three major objectives: *Providing public transportation to and from the plant, grouping of workers and working out a traffic control and parking plan on plant premises and access roads.*

The first step toward a comprehensive plan is an Employee Transportation Survey.

Preparation and Distribution of the Questionnaire: Distribute questionnaires requiring definite information regarding the distribution of employee residences, the methods of transportation now used, the number of employees on each shift using each type of transportation, the routes followed in going to and from the plant, the average number of persons carried per car, the estimated mileage left in employees' tires, etc. A readable map blocked off in ordinate squares of the survey area should be printed on its back.

In some plants questionnaires have been addressographed with the employee's name and clock number, insuring 100 per cent distribution and different colored questionnaires used have been for each shift. The objective of the survey should accompany the questionnaire in a letter signed by the plant management.

Tabulation of Data. Prepare a large wall map identical to the one printed

on the back of the questionnaire. Select a large flat working surface for the stacks of questionnaires. Sort the filled-out questionnaires by shifts. Group together in each shift, all those questionnaires which have checks or crosses in the same ordinate squares. For example, all squares listed as "A-1" go into one pile, A-9's go into another and so on for each shift. Enter the total number of employees from each shift in a corner of the proper ordinate square on the master map. For example, office—12; 1st—68; 2nd—40=120 employees living in the same ordinate square.

File questionnaires according to ordinate squares. If mechanical punch card and calculating machines are available, considerable time can be saved.

Establishing Employee Districts. Examination of the ordinate figures on the master map will reveal concentrations of employee residences. The density of these concentrations and the area covered by each will vary. Divide these areas into districts so that each heavy concentration of employee origins (which may cover any number of ordinate squares) will fall within the boundaries of a single district. Prepare district summary sheets.

Computation of District Data. Compute for each district all the information on the questionnaires from each ordinate square encompassed by the district. Enter computations on the District Summary Sheet. Divide the total number of vacant seats in each district by 4.50. This gives the approximate number of excess vehicles driven to the plant each shift and day. This number, therefore, is a guide to the number of cars that should be left at the district parking lot or at home. Drivers are then divided into two groups, "odds" and "evens," according to the last digit in their license plate numbers. These two groups drive on alternate weeks. Notices on bulletin boards, in employee publications, or at gates giving the "odd-even" schedule will save confusion among employees.

Master Summary Sheet—Summarize all districts on a Master Summary Sheet for an overall transportation picture.

Assembly of Data — Assemble all district Summary Sheets for each shift in numerical order. Starting with shift one, bind these in a loose-leaf notebook with a map showing district outlines, employee concentrations in each ordinate square and the summarized data of each district. Management may move ahead to the planning phase.

Employee Education—Serious delays may be avoided if human factors such as:

The disinclination of most humans to cooperate where their private habits are suddenly upset and the changing attitudes of employees regarding the "pinch of transportation shortages" is recognized and compensated for by a publicity program.

Start slowly. A general letter stating the present shortage of transportation and its expected influence on future habits has proved an excellent first step.

Next, in the plant bulletin or publication, the ratio between total available seating capacity in cars driven to the plant and the actual number of seats used is presented in the first effort to encourage voluntary group-riding. The average load (approximately 1.80) compared to the average capacity (approximately 4.50+) makes excellent copy material. Employees are urged to increase the plant average to 3.5 or better.

Clarify the question of driver liability insurance and issue further bulletins illustrating the periodic waste of tires, gas, etc.

In Terms of Miles—Multiply the total excess vehicles by the average daily one-way trip mileage, double the number, and the total will indicate the total number of vehicle miles wasted each day.

In Terms of Gasoline—Divide excess vehicle miles by 15 and this gives the number of gallons of gasoline wasted per day.

In Terms of Rubber—Divide excess vehicle miles by 6,250. The answer will indicate the number of tires wasted each day.

In Terms of Vehicles—Divide excess vehicle miles by 60,000 to find out how many cars are consumed each day.

Constant employee education based upon accurate data does much to increase voluntary group-riding.

Employee Rides Bureau: A natural question raised by the educational effort is, "How may I find out who lives nearby so that I can either ride with them or get passengers?"

The recommended procedure is simple. The questionnaires were originally sorted by ordinate squares. They should be kept in this order and filed under ordinate square numbers with subheadings of "Shift 1, 2, 3, 4, and Office." Back of each shift tab, the questionnaires are arranged alphabetically by *name of street* on which employee lives. The file is located in a booth with an attendant to consult with employees.

Place a master map with ordinate squares on the booth counter, then an employee desiring transportation information simply points to his square and states his shift. The attendant refers to the proper file and calls off those drivers with excess seats or passengers seeking rides. As each questionnaire is used an appropriate mark is made on the questionnaire to avoid repetitious use.

Advance Planning: Private transportation will taper off slowly at first and more rapidly by mid-winter 1942-1943. Therefore, the following items must be investigated and decisions reached with respect to each district before the present pressure becomes a threat to actual plant operation.

Will adequate express bus service from points of employee concentration to the plant be available?

If sufficient bus seating capacity is not available at the present shift hours, would more buses be available if plant shift hours were changed?

Which concentrations of employees cannot be serviced by existing bus lines and what are the prospects for extended, new or special service?

What land in the rural areas might be available for loan on a temporary basis for use as a parking lot for either private vehicles or bus loading?

Have railroad facilities been developed to their fullest extent with special stops?

Have the Army or Defense Officials designated any roadways leading to the plant as special routes?

What plans has the local traffic engineer prepared for routing, signs and marking for adjacent roadways, development of emergency dispersion points, pedestrian protection, loading zones for buses and district and parking lots for cars?

Have local Police and Fire Departments provided adequate regulations and personnel?

In all wars, transportation, the ability to move men and materials on the battle front and at home, has often been a critical factor. Every possible effort must be made to conserve our present facilities to cut waste and to increase efficiency.

An original article by Dwight H. McCracken (Mem. I.T.E.), Director, and Bryant Burkhard, Traffic and Safety Bureau, Liberty Mutual Insurance Company, Boston, Mass.

SELECTION OF EVACUATION ROUTES

by RAY F. RIEGELMEIER

PREPAREDNESS against a possible air attack by the enemy is part of the traffic engineer's responsibility. One of the complications that would undoubtedly appear after an air raid is the routing of evacuees.

Remembering the grave difficulties of the French Army when it endeavored to retreat speedily and the dire circumstances created by the confusion, the Commonwealth of Pennsylvania has prepared traffic control plans for moving evacuees in the hope of avoiding a similar disaster. *After* a first assault we can expect many families to vacate the danger areas for the homes of relatives and friends in the interior. To guide and direct these persons special precautions are believed necessary.

In preparing traffic control plans for an evacuation the Pennsylvania Motor Police conducted a detailed survey of the probable theatre of operations. An evacuation area of approximately 100 miles west of the Delaware River from the New York State Line to the Maryland State Line was selected as appropriate. Each point of entry into the State from New Jersey was studied carefully. The principal entrance points are over bridges, and each bridge was classified for capacity in live load, width, number of lanes, and whether it is a toll or a free bridge. Ferry schedules and carrying capacity were noted.

From each of our 23 evacuation points, evacuation routes were selected directing evacuees westward, except those going to Baltimore or Washington. In selecting these westward routes, the plan calls for the use of the MAJOR highway system in practically every instance. In fact, where MAJOR highways are in the vicinity of the evacuation points, they will be used without exception.

Pennsylvania's 23 evacuation points were divided into four sectors. Routes from the evacuation points in each sector were converged toward the nearest MAJOR highway route leading westward. Each sector represents a basic unit of command and the four sectors are merged into a composite organization through the facilities of telephone, teletype, and commercial broadcasting stations. A Motor Police Officer will be in charge of each sector with Headquarters located in the police barracks in all important cities.

Control points are established at major intersections in each sector and were selected and designated according to the traffic routes. For example, the control point at Fogelsville is 22A as this is on U. S. Route 22. Each succeeding control point westward is indicated as 22B, 22C, etc. The above information was tabulated and given to the traffic engineer who prepared maps illustrating the selected evacuation routes. A separate map was prepared for each sector which contained, in addition to the selected evacuation routes proper, all major intersecting traffic routes, control points and evacuation points with information on the widths and capacities of all bridges crossing into the state, secondary routes which would be used in the event of a complete closure of a major highway because of military necessity, the command post location, communication and liaison information, the number of hospitals and doctors in each city or town along the route, the strength of the police force, the police equipment available in each city and town and the design and location of BRIDGEHEAD and DIRECTIONAL evacuation signs. The sec-

tor maps were prepared so that each Motor Patrolman at any control point in any sector will have the entire picture of his sector before him. A master map was made covering the entire area.

Surveys were made of the entire area to locate ample radio, teletypewriter and telephone communications for each control point. On a separate Communication Facilities Map, the entire area was divided into smaller areas which are in the broadcast range of the selected commercial radio stations.

Other information concerning the radio stations, such as the call letters, telephone number and frequency, are provided on the map. Incidentally, in order to obtain authority to perform this emergency service by the radio stations we requested them to communicate by commercial telegraph facilities with the Federal Communications Commission in Washington, D. C., requesting special temporary authority to operate their stations as "State Police Stations" in the "Emergency Service" on Regular Assigned Broadcasting Frequency in accordance with Section 2.92 of the Rules and Regulations of the Federal Communications Commission due to National Emergency.

Upon the approach of enemy aircraft and at the direction of the interceptor command of the U. S. Army, radio broadcasting facilities will be restricted. In which event regular channels by teletype and telephones will be utilized.

The Communication Facilities Map also lists every control point by number with information concerning the locations and telephone number of every telephone teletype contact. The teletype information is recorded as RECEIVING ONLY or SENDING AND RECEIVING Stations.

These arrangements therefore, present a very complete and positive control system for the prompt dispatching of orders from the center of operations and communications by the Command Officer at Reading.

The Motor Police have contacted all municipal officials along the evacuation routes, and through the cooperation of the local authorities, assurance has been provided that such evacuation movements will be expedited through the cities and towns by the local police officials.

The signs selected for providing information to the evacuees will naturally be supplemental to the instructions and directions of the Motor Police at the control points. Large BRIDGEHEAD signs will confront the evacuee, bearing the message "EVACUEES FOLLOW GREEN ARROW." A vertical Green Arrow is shown at the top of the sign pointing directly ahead. Throughout the entire route, the same Green Arrow signs will be erected at points where evacuees may have a tendency to select the improper route and where no control station has been located. Along the route at the proper points are other large DIRECTIONAL signs providing information on the direction to the larger cities. The plan contemplates moving the evacuees westward for a distance of approximately 100 miles before they are diverted toward their destination.

All of the signs required are made in the Department of Highways' sign shops in the various counties involved in this traffic control plan. All signs will be available for immediate erection upon notice. The employees in chage of erecting the signs have been previously instructed exactly where they are to be located, and after transmittal of the emergency call from the center of operations and communications at Reading to the Chief Maintenance Engineer of the Department

of Highways the latter will instruct all Highway Offices involved to immediately erect the necessary evacuation signs. This entire process can be performed in an inconceivably short period of time.

It is our belief that by having a definite plan to follow and by obtaining all of the necessary detailed information in advance, and by making this information accessible to all persons participating, the plan can be put into operation quickly.

Another set of plans has also been prepared which will expedite the movement of civilian and/or evacuation traffic from U. S. Traffic Route 22 between Indiantown Gap Military Reservation and the New Jersey State Line. These plans were prepared so that if necessary, the entire section of U. S. Route 22 can be closed on extremely short notice to permit the full width of the highway to be used for moving the entire personnel of Indiantown Gap Reservation toward the East Coast if such a necessity exists.

The maps, supplemented by written instructions, are forwarded to all interested agencies so that the assisting personnel is familiar with each detail.

A Military Highway map has also been prepared on which all military and naval posts in and around Pennsylvania are spotted.

An original article by Ray F. Riegelmeier (Mem. I.T.E.), Traffic Engineer, Commonwealth of Pennsylvania, Harrisburg, Pa.

THE EMERGENCY TRAFFIC ENGINEERING PROGRAM OF ONE STATE

by C. E. FRITTS

WHAT essential activities comprise the wartime traffic engineering program of a state? How can we adjust our functions to provide the greatest possible utility? How can we operate with the loss of trained personnel and yet produce results essential to meet wartime problems? The traffic engineering division of every highway department is probably asking itself these and many more questions.

The State of Washington, in addition to being located within a combat zone is also confronted with the problems resulting from the location of many important war industries, such as airplane plants, shipyards, navy yards, and numerous training bases.

Planning of functions to facilitate military and war transportation is the prime responsbility of the entire highway department and the traffic engineering division assumes a position of importance in assisting all agencies to achieve the greatest benefits to transportation in the face of many handicaps.

We have attempted to evaluate our available manpower and gear it to wartime production.

Our traffic division consists of three major subdivisions—Traffic Engineering, Regulation and Inspection of Motor Vehicles and Highway Planning.

The traffic engineering subdivision is committed to the following objectives:

Accident analysis and research. No sound approach to an accident reduction program can be conceived without knowing the number, the location and causes of accidents; therefore, analysis and research must continue. New and enlarged military installations and war industry plants are changing the accident pattern of the entire state, and we must keep pace with the changing problem if effective results in accident reduction are to follow.

Traffic surveys. These are confined

to war industry plants and military bases. The surveys show the traffic services that will result from new road or street construction and indicate minimum design standards. Studies are made of potential housing areas, origin and destination of traffic, volumes and turning movements, use of existing transportation and parking facilities, and any other data relating to the specific problem. These surveys provide a basis for geometric design, routing, signalization, parking, the establishment of one-way streets, the restricting of certain turning movements, the extent of use of motor vehicles in comparison with other transportation facilities, and reveal the number of persons carried by each vehicle.

Signing, marking and signalization. Signing, marking and signalization activities are confined to installations required by war industry activities. Temporary signals are required in many places; however, where sufficient warrant exists, as in the case of war industries, signals are being installed permanently with proper channelization. New signs are being installed where necessary but existing signs must last for the emergency. The use of glass beads for striping is being continued as an aid to traffic in blackouts. The division participates in the development of regulations for traffic blackout devices and will conform to War Department recommendations as soon as studies are complete.

Regulatory measures. A forty-mile-per-hour speed limit on all state highways has been imposed and numerous other speed restrictions have been established in areas near new military installations.

Cooperative effort with other agencies. Since agencies of the Federal Government, the State and its local subdivisions, and many civic organizations are embarked on varying types of war transportation programs, aids are being given in the form of usable basic data thus increasing the effectiveness of the individual programs.

Aid to cities. The division is supplying traffic engineering aid in the form of organization, supervision, and analysis of traffic surveys to cities under 50,000 who are without traffic engineers and experiencing a wartime development.

Accident prevention program within the department. The Director of the Department has authorized the Traffic Division to proceed with the organization and inception of a plan to reduce to a minimum the number of traffic and industrial accidents within the entire department.

The motor vehicle subdivision is also on a war emergency program.

Weighing of commercial vehicles. Because relatively few highway improvements can be made during the war, care must be exercised to maintain a close balance between highway structural capacity and truck loadings.

Weighing also provides a fairness of competition between operators by enforcement of uniform loading requirements and compliance with license laws. Furthermore, restriction of illegal loading tends to preserve the life of motor trucks and promotes safety.

Periodic motor vehicle inspection. Because of the necessity of conservation of vehicles, tires and fuel, and because inspection is essential to any well-rounded program of accident prevention, greater emphasis than ever is being given to inspection. We are making use of the inspection stations for the dissemination of information relating to the care and use of motor vehicles and inspectors are being trained to provide all motorists with accurate information as to the care and maintenance of their vehicles.

The highway planning subdivision has developed information to guide the programming and the construc-

tion of the strategic highway system. The planning survey information has been invaluable in locating the deficiencies of present highways with relation to access roads, the protection of vital facilities, and many other phases of war preparation. Its maps have been extremely valuable to all defense agencies and the military forces. The activity of this subdivision will continue in such form as requests are received for data from the military forces and the Public Roads Administration.

The division, in cooperation with the other branches of the department, is now embarking on a program of planning for the post-war period. It is essential that traffic engineers participate actively in the determination of the desirable objectives of services to be given by future highway development. Because of his experience and training, he is in a position to properly evaluate existing deficiencies and to develop the criteria for evaluating where and how money shall be expended to insure maximum benefits from whatever expenditures are to be made.

The division has participated actively in the functions of the Highway Traffic Advisory Committee to the War Department. An Emergency Highway Transportation Unit has been formed. Its functions are as follows:

Preparation of an alternate system of routing to be used by essential civilian traffic in the event major routes must be completely utilized by military traffic.

Analysis of each route as selected, section by section, and preparation of plans for immediate restoration in the event of any damaged structure or roadway facility.

Coordination of these plans with all other agencies affected, including the Army, the local civilian defense councils and police organizations.

This plan makes it possible for all local defense agencies to superimpose their local transportaton movements onto the larger master plan without fear of conflict with essential military movements.

An original article by C. E. Fritts (Assoc. I.T.E.), Traffic Engineer, Traffic Engineering Division, Washington Department of Highways, Olympia, Wash.

MILITARY TRAFFIC TRAINING

COMPREHENSIVE and practical instruction in how to "Keep 'Em Rolling" through effective traffic control measures forms the basis of a four weeks course for officers of the Corps of Military Police attending the Provost Marshal General's School at Fort Myer, Virginia. Recognized as one of the major problems and responsibilities of the military police, traffic control subjects comprise fifty per cent of the complete military police course.

Instruction parallels that given to civil traffic police and traffic engineers to a considerable extent, but differs in some respects because much military traffic consists of scheduled column movements and is affected by tactical considerations. In addition, the close coordination which must exist among military police, army engineers, and unit staffs requires that students be familiarized with all operations involved in military traffic control.

The course begins with elementary instruction in the fundamentals of traffic control, primarily as developed and applied in civil practice. Essential differences between civil and military traffic are then indicated and the general application of civil practices to military situations is shown. Early in the course, students are familiarized with problems and techniques involv-

ed in handling motor columns. Instruction covers the various types of march methods, composition and control of columns, and types of military vehicles.

Following this basic instruction, attention is directed to the elements of traffic control in a theater of operations. The three major phases: reconnaissance, planning, and execution, are successively treated. Greatest emphasis is placed upon executions, the concern of the military police. Under this heading are discussed such topics as establishment of control areas, personnel assignments, communications, supervision, emergency adjustments of traffic circulation plans, and traffic control equipment.

Next comes attention to control problems and operations in the Zone of the Interior, which comprises that part of the United States not within a theater of operations. Three general topics are treated under this heading: traffic at military reservations, column movements on public highways, and traffic control during blackouts, air raids and other emergencies. Special emphasis is placed upon establishment of proper liaison with civil traffic authorities throughout this phase of the course.

Paralleling these two courses on general operations involved in traffic control is a course dealing with specific techniques of traffic regulation. Students are instructed in the manual regulation of traffic at intersections, the operations of a traffic patrol, aerial traffic control, column escort work, and other techniques.

Special short courses are also given on traffic regulation, enforcement and accident investigation. These subjects are approached from both the military and civil standpoint.

A wide variety of instructional methods is employed. Classroom sessions are kept to a minimum and lectures are supplemented whenever possible by demonstrations, use of maps, charts and models, and group discussions. Almost half the course consists of practical field work in which students apply techniques covered by lectures and training literature. Field work includes reconnaissance of a selected roadnet near the school, simulated combat zone traffic control problems in which students are assigned to all the various duties and posts actually involved in such situations, actual regulation of traffic at busy intersections in Washington, riding with accident investigation squads of the Washington police, and many other activities.

Five officers are assigned to the staff of the Traffic Control Section, all of whom have had practical experience with various phases of the subject, from both a military and civilian standpoint. In addition, specialists from other branches of the army and civilian traffic authorities are brought in as guest instructors.

In addition to conducting this training course, the staff of the traffic control section is concerned with various other projects relating to the promotion of greater efficiency in military traffic. Among current projects are the development of courses of instruction on traffic for inclusion in Officer Candidate School and Mobilization Training Program curricula, preparation of training films, writing of materials for dissemination to units as a supplement to field manuals, and coordination with other War Department agencies on various research and development projects relating to traffic control. The first class of 215 officers was graduated on March 28. The second class will have been graduated by the time this issue reaches the subscriber.

Special release to TRAFFIC ENGINEERING from Director of Publications, Major Frank J. Day, the Provost Marshal General's School, South Post, Fort Myer, Va.

THE RELATION OF TRAFFIC ENGINEERING AND CITY PLANNING

by HENRY F. AUMACK

THERE are several cities in the United States where the duties of traffic engineer and planning engineer are performed by the same individual. The Municipal Year Book reports six such cities. I believe that in most instances this is a matter of expediency rather than the result of weighing the benefits to be derived against the disadvantages incurred. We all know that insofar as traffic engineering is concerned there are enough things undone and in need of doing to require all of the skill and resources at the disposal of the traffic engineers, without saddling them with additional duties. The same is equally true of City Planning. Nevertheless, there is a definite relationship between City Planning and Traffic Engineering.

If the Traffic Engineer is confined to the installation of traffic control signals, signs and markers as they are needed and the adoption and enforcement of traffic and parking regulations, there really is no connection between the Traffic Engineer and the City Plan. If, on the other hand, we consider traffic engineering as a means to an end, the development of the best possible traffic control and regulation, and if city planners consider it in the same manner, there is a close-knit bond that should be recognized.

City planners, through the use of such devices as zoning, set-back or building lines, building height and area regulations, mandatory garages and off-street loading docks, can protect and preserve traffic carrying capacities for which the streets are intended.

Zoning tends to fix the traffic pattern inasmuch as local traffic is concerned. Any extensive change in the classification of zoning districts will cause the traffic pattern to shift.

All of these planning and zoning regulations relate directly to the work of the traffic engineer. In fact, some of them have been designed specifically for his benefit, probably at his suggestion.

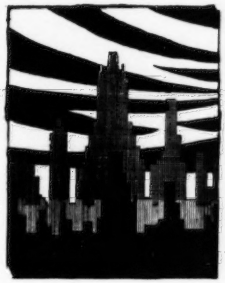
I believe that most cities can furnish one or more good examples of streets or highways developed as traffic carriers to relieve congestion on some other streets that, in spite of being well designed for the purpose and having adequate traffic control and regulation, have failed to accomplish this purpose because of the lack of coordination with other features of the city pattern. The encroachment of many kinds of undesirable business uses along the street have been responsible. The constant stopping and standing of vehicles along the curbline, the confusion caused by cars entering or leaving the traffic stream, and the increased number of pedestrians crossing the street reduce the capacity and increase the accident rate of the highway. The encroachment of undesirable business uses along the streets carrying large volumes of traffic is a natural but not an unavoidable sequence to the rapid increase in traffic density. It is perfectly natural for merchants and speculators, large and small, to be attracted to the streets carrying the most traffic. At least it is a most common occurrence. The results of such attraction, if not anticipated and prevented, will make it necessary for traffic engineers to seek for another means of relieving the congestion on the new street, and another by-pass will need to be by-passed.

The location of business districts in relation to traffic streets has a very direct bearing upon the problems of the traffic engineer. Business districts create parking problems, pedestrian problems, speed problems and cause interference from loading and unloading trucks. The traffic engineer, then, should be interested in the design and location of local business districts, and his consultation and advice are of value to the planner. The provisions for off-street parking space, the distance buildings are required to be set back from the street line, the location and size opening for driveways, the prevention of vision obscurement and potential pedestrian hazards resulting from the development of the local business district should be of sufficient importance to attract his interest and generate the kind of constructive criticism that, if accepted and carried out, will make his traffic problems less difficult after the district is fully improved and occupied.

The location of parks, playgrounds, schools, public buildings, hospitals, stadiums, auditoriums, factories, freight terminals and airports are all in the province of the city planner, and they all create problems demanding the attention of the traffic engineer. It is reasonable to assume that he should be consulted in regard to their location and development. It is also his concern whenever any large district is to be zoned or rezoned, because the uses of property in any district will determine the character and density of local traffic in that district and the regulation of such traffic should be a factor to be considered.

Failure of the traffic engineer to recognize and remedy or alleviate the causes of congestion in the central shopping district may cause the city planner to lie awake nights. Improper or poorly enforced parking regulations, inadequate or improper traffic control, poorly designed street intersections, unregulated loading or unloading of merchandise, plus insufficient off-street parking space at a reasonable charge, all unite in promoting confusion and traffic congestion. This condition hastens and encourages decentralization to the dismay of the planners, the downtown realty owners and the tax assessor. Any definite urge to decentralize increases the demand for new business locations outside the central district. In many instances these demands for new locations are of improper choice, because most frequently they are selected from only one viewpoint, which is that of the prospective tenant. If the location thus selected does not conform to the zoning pattern, requests for spot zone changes result. Unfortunately, these requests are too often granted, to the detriment of an apathetic surrounding district, in which case there is a decrease in property value in this district as well as in the blighted central district that is being deserted for the new location. Thus we find that the relationship between traffic engineering and city planning is closer than one would ordinarily suspect. It becomes the duty of each to understand some of the problems of the other, and together they are capable of serving the city in ways that are not apparent on the surface. The traffic engineer, through his efforts, can remove much of the urge to decentralize and the city planner can direct the results of it in a manner calculated to do the least harm, or he may even take advantage of the decentralization to improve and rejuvenate the blighted area, which, by the way, may be a long and painful process.

Condensed from a paper given before the Western Safety Conference Sept., 1941, by Harry F. Aumack, Planning and Traffic Engineer, Spokane, Washington.



Stop, Look and Listen

IN MEMORIAM

The Institute of Traffic Engineers mourns the death of RALPH W. EATON who died on June 1, 1942. Mr. Eaton was a strong advocate of traffic safety throughout Rhode Island and his sponsorship of traffic accident prevention programs won him wide acclaim. His untiring efforts in traffic will long remain a shining example to present and future members of the Institute of Traffic Engineers and the many other professional societies and committees of which he was a member.

At the time of his death Mr. Eaton was serving the City of Providence as Public Service Engineer, City Traffic Engineer, Smoke Inspector and Supervisor and Inspector of electric codes and wiring in all buildings.

His professional colleagues join with his friends in extending their heartfelt sympathy to his family and relatives.

CONGRATULATIONS

Edward G. Wetzel (Assoc. I.T.E.) on leave as Assistant Traffic Engineer, State Highway Commission of Indiana has been promoted to the rank of Captain in the Highway Transportation Division, Office of the Chief of Transportation, Headquarters, Services of Supply. This division is primarily concerned with developing means of expediting the movements of War Production supplies and personnel from the time they leave production plants or camps until they arrive at their ports of embarkation.

ANOTHER I.T.E. MEMBER DOES HIS PART

Professor Roger L. Morrison (Mem. I.T.E.) of the University of Michigan recently gave an eight week course on "Traffic Control in Congested Areas" in the Engineering, Science and Management Defense Training Program under the sponsorship of the U. S. Office of Education. The course was to prepare and upgrade those responsible for handling traffic in congested areas and around new and large war industries.

48″ Panel 24″ Panel

◆ DAY ◆ NIGHT

MEETING the EMERGENCY

Reflector Signs now easily made with "REFLECTO-CHAIN"

FOR BLACKOUTS
Available in luminous finish to reflect *with* light and glow *without* light —a recent foreign development.

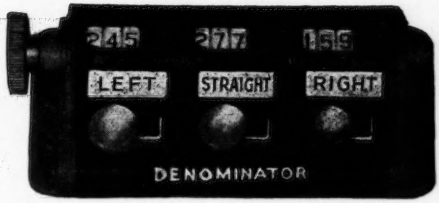
"REFLECTO-CHAIN" *is the quick solution to the emergency created by the shortage of steel.* The answer to Defense restrictions. It can be readily applied to metal, however it is even more easily attached to *Wood* or *Plywood.* Flexible as a string. Any size or style of letter, figure or symbol, can be formed and easily mounted by means of its special screws or nails. If required, it can be furnished to function with complete invisibility from overhead, and, without impairing its horizontal effectiveness. Old or new signs, of any size and type, can be quickly and inexpensively converted into Reflector Signs by using "REFLECTO-CHAIN." The treatment can be with single, double or triple rows of buttons, also by designs, (note illustration) and with different reflecting colors. Write for descriptive literature and prices "Reflecto-Chain" and also Reflector Pavement Markers. Send for trial shipment today.

Manufactured under U. S. Patents Numbers 2,240,777; 2,113,759.

THE STAR-LITE CO.
312 EAST MARKET STREET
INDIANAPOLIS, INDIANA

TRAFFIC COUNTING SIMPLIFIED WITH NEW TRAFFIC COUNT DENOMINATOR

Illustration of 3 unit Counter, classifying directions of travel



Other models with from 1 to 12 classified counting units mounted in horizontal line.

By simply pressing key one count is recorded in classified counting unit controlled by that key.

Touch method employed permitting operator to keep eyes on road at all times.

Quick reset returns all counting units to zero.

Counting units may be classified to represent direction of travel, different types of vehicles, state license plates, and other important classifications in traffic planning.

Now in use by City, County and State Highway Departments throughout the U.S.A.

Quick . . . Accurate . . . Efficient.

— WRITE FOR CATALOGUE —

THE DENOMINATOR CO., Inc. - 261 Broadway, N. Y. City

MEMBERSHIP APPLICATIONS

Allan Thompson Conroy
Draftsman, Department of Public Works, City of Jamestown, New York

Fred Tracy Fowler
Traffic Engineer, City of Portland, Oregon, 407 City Hall, Portland, Oregon

Richard Brown Haynes
Traffic Engineering Aide, City of Portland, Oregon, 407 City Hall, Portland, Oregon

Burton Marye, Jr.
Manager, State-Wide Planning Survey, Virginia Department of Highways, Richmond, Virginia

Gerald Erie Shuttleworth
Highway Traffic Safety Engineer, Michigan State Highway Department, Lansing, Michigan

FIRST I.T.E. STANDARD

The members will be pleased to learn that the first I.T.E. Standard, namely, *Adjustable Face Traffic Control Signal Heads*, has been approved by the American Standards Association.

TRAFFIC WIVES ATTENTION!

Now that Otto K. Jelinek has been appointed U. S. Coordinator for the Chicago Metropolitan Area, the Chicago Park District plans assigning WOMEN to traffic duty at school and church crossings and to guard cars and direct traffic in municipal parking lots. The ladies must be between five feet two inches and six feet and in good physical health. For further information contact "Backwash" McConochie.

CONVENTION AWAKENING

Bed-rock foundations for a new traffic order will be laid in October. A recent questionnaire among all I.T.E. members disclosed that the most popular subject at the moment is "New Services The Traffic Engineer Can Perform for His City (or State)." The old stand-by subjects of previous conventions didn't get enough votes to wad an overload relay. The Program Committee has allocated time during the 3-day meeting this fall only to the topics you want to discuss. You made the program, but you won't sleep in it.

Reason you won't sleep is because you're on the program. Yes, all 150 of you members who are expected plus each of the 75 guests. The Program Quiz revealed that traffic engineers are willing to listen *only* if they also have a chance to talk. No "papers" will be "read" and the longest formal talk will last 20 minutes. Aside from the business meeting, and the joint meeting with the National Safety Council on Monday, October 5, there will be 605 minutes of program sessions. Only 80 minutes of that time will be devoted to talks, while 225 minutes will be given over to round table presentations, 140 minutes to open forums, 80 minutes to discussions and 80 minutes to clinics. Each person present will be responsible for filling 2 minutes and 20 seconds with vital information—or just-as-vital questions.

That's the way you said you wanted it. That's the way it's going to be. The answers to questions put to you in the membership survey covered not only subjects, but also type of program preferred, and names of suggested speakers. It was also disclosed that unless the plans of a large number of individuals are changed, *attendance this year will be higher than ever before.*

Personal attendance was never more important. Your action is going to be required in many new fields right after the Convention — on substitute materials, for example, and on staggered hours and tire conservation. Those of you who have had experience by that time will be obligated to share that experience with your fellow members. Time will be reserved for emergency topics not clearly predicttable, at this moment, as indispensable. All the information will be *current*, but too important and too revealing of things to come for you to wait for distribution in printed form.

Publication of a Proceedings this year, in fact, is extremely doubtful for many reasons. Even if the sessions eventually appear in print, the colorful debates and discussions will have to be abstracted. There may be a good substitute for a die-cast aluminum signal housing but there is no substitute for your finding out *in person* what it is.

You have made a king size program but that wasn't the purpose of the questionnaire. Here's the $64 one. ARE YOU GOING TO BE AT THE CONVENTION?

Contributed by Wm. R. McConochie

PEDESTRIAN PROTECTION CONTESTS SHOW RESULTS

The A.A.A. in connection with its National Pedestrian Protection Program seeks information concerning legal precedents established as to the right to control and regulate pedestrians by ordinance or law. Please send court actions in communities or states, giving citation to Burton W. Marsh, Director, Traffic Engineering and Safety Department, American Automobile Association, Washington, D. C. A recently published A.A.A. Pedestrian Pointer shows the 1941 Pedestrian Contest winners and much valuable data such as non-pedestrian fatalities increased 20% last year while pedestrian fatalites increased only 6½%.

G-E TRAFFIC CONTROLLERS *Keep 'em Moving!*

NO WONDER our Type D traffic-signal controller is serving many of the cities of America. It keeps traffic rolling. It gives you every possible easy-to-live-with feature and a flexibility that protects your system against obsolescence.

In its basic form, this G-E controller provides the two-phase movement required for most intersections. Additions of low-cost accessories make it entirely adequate for the most complex intersections and the busiest thoroughfares. Interconnection to a master timer makes it possible to remotely control the total time cycle or provide three different schedules of green-light lag which make it possible to move inbound-peak traffic, normal traffic, and outbound-peak traffic more efficiently.

Have a G-E traffic control specialist tell you more. Right now, when your time is at a premium, his help on layout and selection of equipment will save a lot of unnecessary shopping around. To bring him to your desk just phone or write the nearest G-E office. *General Electric, Schenectady, N. Y.*

General Electric and its employees are proud of the Navy award of Excellence made to its Erie Works for the manufacture of naval ordnance.

GENERAL ELECTRIC

453-20D-3270

POLICE TRAFFIC TRAINING

Twenty-six $600 fellowships and twenty-six $150 scholarships will be available to city, county and state police and highway patrol officers for study at the Northwestern University Traffic Institute during the 1942-43 academic year.

Our nine-month course in traffic police administration has been suspended for the duration of the war. In its stead 13 fellowships and 13 tuition scholarshps will be awarded for the first course from September 28, 1942 to January 30, 1943, and the same number of awards will be made for an identical course from February 1 to June 16, 1943.

The courses will deal with the basic techniques of traffic control and accident prevention with particular emphasis on traffic facilitation and conservation as it relates to internal security.

OPERATING AGENCY FOR ODT PROGRAM

The National Traffic Advisory Committee to the War Department has assumed responsibility for the operation of the National War Production Transport Program acted upon by the Office of Defense Transportation.

Governors and Mayors have been requested to appoint state and local administrators.

A staff, including a field force, has been assembled under the direction of Mr. J. Trueman Thompson, Willard Building, Washington, D. C.

TRANSPORT HIGH IN THE LIST OF CRITICAL ITEMS

Thomas H. MacDonald, Commissioner of Public Roads Administration, said in a speech in Philadelphia in February, 1942, that when existing highway equipment including vehicles is used to capacity, and it will be; then the greatest reservoir for needed new capacity will be in transport.

GROUP-RIDING ADVICE SOUGHT

"Group riding" programs to conserve on tires, gasoline and vehicles is meeting with varying results. A load factor of 3.0 per car is reported in some communities, but generally it is nearer 2.0 per car.

To increase the load factor to and from work a community group-riding plan is being advanced in Providence, R. I. It is as follows: Connect the "Share-the-Ride" program with a *durational cause* such as the U.S.O. or the U. S. Navy Relief. Workers and motorists wishing to participate in the Group-Riding to Work program and also contribute to the national cause may purchase a book of tickets and a car sticker at the headquarters of the national charity. A worker wishing to ride to and from work would simply stand at the side of the road and exhibit his book of tickets to the motorist who has a sticker. This motorist would then know that the worker desiring a ride to work is willing to contribute to the national cause. The rider gives a ticket to the driver who sends them into the charity headquarters for cancellation. Appreciation is expressed by the sponsors to Norman Damon (Affil. I.T.E.) Vice-President, Automobile Safety Foundation for his suggestions. I.T.E. members are urged to send at once comments and criticisms to the Editor of TRAFFIC ENGINEERING for study before initiation of the program.

UNMASKING TRAFFIC SIGNALS

Salford, England, is unmasking its signals until the end of double summer time and extingushing them durng black-out hours. Masked lights were responsible for some daylight accidents. Double summer time coupled with a decrease in traffic improves daylight conditions without any appreciable risk during darkness.

British Road Federation, May, 1942

"You can't beat CATAPHOTE REFLECTOR BUTTONS... *for Brilliance, Permanence and Dependability!"*

More and more traffic engineers throughout America rely on Cataphote Reflector Buttons for all-around superior performance! They know that under the severe tests of time and weather on highways from coast to coast...Cataphote "stands the gaff"...doing an outstanding job of illuminating danger points with *brilliance, permanence* and *dependability*. No moisture condensation . . . no yellowing with age . . . brilliance guaranteed 3 years! Get more facts about Cataphotes for a wide range of wartime traffic control problems.

WESTERN CATAPHOTE CORPORATION
TOLEDO, OHIO

REAR ENTRANCE
unmounted buttons for wood or metal signs.

FRONT ENTRANCE
mounted buttons available in 5 sizes

Front Entrance Buttons for wood signs...in 5 sizes... easily, quickly installed.

FERTILE FIELD FOR "SHARE THE WEAR"

According to the findings of a survey conducted by the Michigan State Highway Department in January, 1942, one out of every five Detroit workers lives more than ten miles from the factory. Of the 434,683 persons covered by the survey 326,649 go to work in their cars. In 633 plants, 85 per cent of the total number, more than half the employed, representing 81 per cent of all employees, use and depend on their automobiles to take them to work. In 233 plants, 30 per cent of the total, per cent of the employees, representing 31 per cent of all employees surveyed, use private cars for transportation to their jobs. In 51 plants, all employees, a total of 65,986 persons, use their cars to reach their places of employment. Even within the city limits, 61 per cent of the workers depend on their own cars. In Detroit suburban areas, the percentage is higher, running as high as 90 per cent. Only a few large industrial areas run below the State average of 75 per cent.

ELECTRONIC COP WARNS SPEEDSTERS

The science of electronics has now supplied the answer to the speeding motorist who tells the judge he did not know how fast he was going, according to Frazier Hunt, General Electric newscaster.

"Driving at night along a highway near St. Paul and Minneapolis, the motorist's attention is caught by the sudden turning on of a large illuminated signboard ahead of him. A second or two later the sign flashes the speed of his car in lighted numbers big enough to read a mile away. If the speed is too fast for the danger spot ahead the sign flashes an additional warning in the words, 'Slow Down.'

"Startled by this electronic speed cop that issues no summonses, the motorist may wonder what mathematical genius is hiding behind the sign. The explanation is simple. As his car passes a certain point on the highway it interrupts a beam of invisible light rays. A photoelectric tube turns on the sign, and starts an electronic timer which measures the car's speed. As the car passes the second electric eye the timer calculates the speed, and flashes the speed in lights, as a warning to the driver.

"Electrons, travelling with the speed of light, get the message on the signboard in plenty of time to warn the fastest driver. There is nothing to be gained by arguing with the speed shown on the sign. To an electron, one-millionth of a second is a long time.

"This application of the electronic tubes, developed by a St. Paul engineer, is but another example of helpful, public services which can be performed by electronic devices."

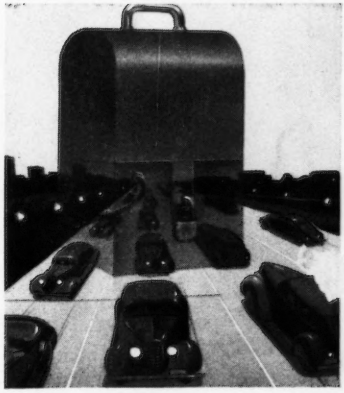
PUBLIC OWNERSHIP OF RAILROAD RIGHTS-OF-WAY

One of the obstacles which now confronts the public works program for transport development is the fact that railroad rights-of-way, unlike the basic facilities of other transport agencies, are privately owned. As a result, both the planning of an overall transportation system and the profitable investment of public capital are thwarted; and exclusion of the railroads from a large-scale public works program accentuates the problem of unequal promotional policies, hence of an uneconomic distribution of traffic. There is urgent need, therefore, that all rights-of-way be under public ownership to permit a properly conceived modernization of the transport plant as a whole.

National Resources Planning Board
March, 1942

Traficounter —— FOR LOW COST TRAFFIC FLOW COUNTS

Keep pace with the changing traffic flow picture . . . no additional man-power required . . . it's easy. Let TRAFICOUNTER — the portable, automatic, traffic recorder —do the work.
Read these famous TRAFICOUNTER features . . . Totals printed every 15 minutes. Totalizer resets to zero each hour. One man can install the TRAFICOUNTER in about 10 minutes. Surpasses all speed and accuracy records in its field. Machines can now be supplied from stock. Price and illustrated pamphlet sent on request.



SPEED S-A ACCURACY

STREETER-AMET COMPANY 4103 RAVENSWOOD, CHICAGO

STREETER-AMET COMPANY

LOOKING AHEAD

July 22-23
American Society of Civil Engineers: Annual Convention. University of Minnesota, St. Paul, Minn.

Sept. 21-23
International Association of Chiefs of Police. Hotel Pennsylvania, N. Y. C.

Oct. 2-4
Institute of Traffic Engineers, Chicago, Ill.

DO YOU KNOW

Flasher signal signs in Chicago are being replaced by metal reflector signs.

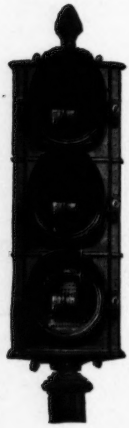
Plans are being completed to remove gas flasher beacons and replace with other appropriate traffic control devices in Providence.

East Cleveland found that group replacement of traffic signals gave better safety and service for approximately the same cost as individual replacements.

Minnesota Highway Planning Survey road travel shows that travel within towns of 10,000 population and over is predominantly of local origin. 93.6 per cent of the Minneapolis and St. Paul travel was completed by vehicles owned in these cities.

British Traffic Authorities have found it necessary to rule that people waiting at a stopping place, stand or terminus for a bus, trolley or trolley-bus must form a queue not more than two abreast and intending passengers must keep their places.

ELECTRIC SIGNALS



Standard signals adapted for all types of mounting. Synchronous and induction control mechanisms and accessory devices.

REFLECTOR SIGNALS

When signs are not enough or expense is a factor, reflector signals keep down both cost and accident rate.

8"; Six 1⅝" Stimsonites

15"; Six 3" Stimsonites

REFLECTOR SIGNS

Large Stimsonized and standard reflector button signs for all traffic conditions.

72" SIGN
18" LETTERS

24" SIGN
6" LETTERS

DELINEATORS

Reflector Delineation gives essential road information after dark at daylight distances. The alignment and driving limits of the road are outlined by a channel of light.

SIGNAL CORPORATION

SS SIGNALS

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